

Date: Monday, 18/08/2008 3:31:36 PM
 User: Julie Lecocq

Process Sheet

Customer : CU-DAR001 Dart Helicopters Services	Drawing Name : SKIDTUBE	<i>CHG 002</i>
Job Number : 41315A		
Estimate Number : 11546		
P.O. Number :	Part Number : D204635041	
This Issue : 18/08/2008 S.O. No. :	Drawing Number : D2590 REV D	
Prsht Rev. : NC	Project Number : N/A	
First Issue : / / Type : SKIDTUBES	Drawing Revision : D	
Previous Run : 41314A	Material :	
Written By :	Due Date : 15/09/2008 Qty: 1 Um: Each	
Checked & Approved By : <u>02.08.18</u>		
Comment : Est Rev:F 02.08.28 FP was QC5 in Step 27; Added QC5 to Step 30 KJ		
Est Rev:G 07-07-09 Added SS Wearplates & Gaskets JLM		

Additional Product

Job Number:



Seq. #:	Machine Or Operation:	Description :
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1.0	D25001190	Ext'n -I' Beam Tube 4"
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Comment: Qty.: 1.0400 Each(s)/Unit Total : 1.0400 Each(s)

Pick:

Qty	Part Number	Description	Batch
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1	D2500-1-190	Skid Tube Extrusion	<u>40180</u>
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JB 8-9-10

2.0	D2597	204 Web
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Comment: Qty.: 1.0000 Each(s)/Unit Total : 1.0000 Each(s)

Pick:

Qty	Part Number	Description	Batch
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1	D2597	204-Web	<u>37328</u>
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JB 8-9-10

3.0	SKIDTUBES 1	SKIDTUBESS RESOURCE 1
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**Comment:** LANDING GEAR RESOURCE 1

1- Inspect mat'l D2500-1-190 for damage

2-Cut D2500-1-190 per Dwg D2590 .Debur ends

3-Drill pilot holes using drill jig DT 8149 & DT8711-1&-2

4-Acid etch and Alodine tube per QSI 005 4.1

5-Open holes to 0.500" as per Dwg D2590 without cutting fluid

6-Countersink holes as per Dwg D2590 without cutting fluid

JB 8-9-10

W/O:		WORK ORDER CHANGES							
DATE	STEP	PROCEDURE CHANGE		By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector	

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)							
DATE	STEP	Description of NC Section A	Corrective Action		Section B		Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng		Sign & Date			

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Job Number: 41315A

Part Number: D204635041

Job Number:



Seq. #:

Machine Or Operation:

Description :

7-Deburr and blow out all chips from inside of tube

8-Bond web in place per QSI 015. Allow 12 Hrs. cure time before cutting

Pick:

Qty Part Number Description Batch

A/R Sikaflex-291 h108801

Sikaflex expire date: 8-10-1

Start Time: 10:00 8-9-10

Fin Time: 10:00 AM 8-9-22

JP 8-9-10

4.0

BENDING

BENDING MACHINE - SKIDTUBES



Comment: BENDING MACHINE

Bend as per program D2590.C on CNC Bender

RT 08-09-22

5.0

SKIDTUBES 1

SKIDTUBESS RESOURCE 1



Comment: LANDING GEAR RESOURCE 1

1-Cut tubes as per Dwg. D2590. FE 08-09-22

2-Deburr ends after cutting. Remove alodine from around holes

BE 08/09/22

6.0

QC5

INSPECT WORK TO CURRENT STEP



Comment: INSPECT WORK TO CURRENT STEP

S 08/09/22 (+)

7.0

D25763

Step (maching detail)



Comment: Qty.: 1.0000 Each(s)/Unit Total: 1.0000 Each(s)

Pick:

Qty Part Number Description Batch

1 D2576-3 Step 238392

BE 08/09/23

8.0

D2579

Crossbolt Spacer



Comment: Qty.: 17.0000 Each(s)/Unit Total: 17.0000 Each(s)

Pick:

Qty Part Number Description Batch

17 D2579 Spacers 240831

5P 244432 12P

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Job Number: 41315A

Part Number: D204635041

Job Number:



Seq. #:

Machine Or Operation:

Description :

9.0

SKIDTUBES 1

SKIDTUBESS RESOURCE 1



Comment: LARGE FABRICATION RESOURCE 1

1-Prepare tube for welding D2576-3 StepRemove alodine as required.

BE 08/09/23

2-Weld step D2576 as per Dwg. D2590 and QSI 004

A/R

Aluminum Rod

M/08708

BE 08/09/23

3-Weld crossbolt spacers D2579 as per Dwg. D2590 and QSI 004. For D2579 side, pass 3/8" drill, weld other side, pass 3/8" drill

spacers, weld one

A/R

Aluminum Rod

M/08708

BE 08/09/23

4-Grind welds as per Dwg D2590 Grind flush ridge made from bending

5-Drill holes for wearplates using DT 8218, & DT8937 Open holes to 19/64", adjust stopper not to hit web. Deburr

6-Counterbore crossbolt spacers to 7/16" ID x 1.0" deep as per Dwg D2590. Deburr holes

JD 8-9-23

7-Drill pilot holes for aft cap using DT. 8215 Open holes to #6 Drill bit. Deburr

8-Drill pilot holes for Tow ring using DT8091, open to .640" and Deburr

10.0

QC10

VISUAL INSPECTION OF GROUND WELDS



Comment: VISUAL INSPECTION OF GROUND WELDS

S 08/09/24 (20)

11.0

QC5

INSPECT WORK TO CURRENT STEP



Comment: INSPECT WORK TO CURRENT STEP

S 08/09/24 (20) (N)

12.0

HAND FINISHING1

HAND FINISHING RESOURCE #1



Comment: HAND FINISHING RESOURCE #1

Powder Coat White (Ref. 4.3.5.2) as per QSI 005 4.3

pressure was 4
08.08.23
Start Time: 3:30
over Temp: 320
End Time: 11:40

08/09/25

13.0

QC3

INSPECT POWDER COAT/CHEMICAL CONVERSION



Comment: INSPECT POWDER COAT/CHEMICAL CONVERSION

08.10.26

(PB) (20)

W/O:		WORK ORDER CHANGES						
DATE	STEP	PROCEDURE CHANGE		By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: D204-635 041 PAR #: _____ Fault Category: _____ NCR: Yes ☒ No ☐ DQA: JA Date: 08.11.11
 QA: N/C Closed: _____ Date: _____

NCR: <u>41315A</u>		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			
08.10.01	12.0	employee noticed on w/o # 41344 that the towing hole is off by 5.60". R.I. employee used wrong	<u>JA</u> 08.10.01	Have 2 x 6061-T6 Plug OD .640" x .160 Thick to weld into the hole. in <u>109478</u>	8.8 08/10/21	C 08/10/22	<u>JA</u> 08.10.01	S 08/10/21
				Clean hole: weld plug in to place and grind flush. <u>PLS M107213</u>	BE 08/10/22 08/10/22			
		Drill Sig. 204 Drill Sig was same DT# AS 205; Tow Ring location was not measured @ inspection.		Drill Tow ring hole as per dng. and debur	BE 08/10/22	S 08/11/05		S 08/10/21
				Scuff Scuff entire tube with 320g and re powder coat per QS1005. See NCR 08-092 i w/o 41314A	M 08/11/05			

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Job Number: 41315A

Part Number: D204635041

Job Number:



Seq. #:

Machine Or Operation:

Description :

14.0

D2855

Cap



Comment: Qty.: 1.0000 Each(s)/Unit Total: 1.0000 Each(s)

Cap

Batch: B41340

JS

15.0

AN35A

Bolt



Comment: Qty.: 2.0000 Each(s)/Unit Total: 2.0000 Each(s)

Bolt

Batch: M100188

JS

16.0

AN960JD10L

Washer



Comment: Qty.: 2.0000 Each(s)/Unit Total: 2.0000 Each(s)

Washer

Batch: M105793

JS

17.0

ALS71032130

Insert



Comment: Qty.: 44.0000 Each(s)/Unit Total: 44.0000 Each(s)

Insert

Batch: M105819

JS

18.0

AN3C4A

BOLT



Comment: Qty.: 44.0000 Each(s)/Unit Total: 44.0000 Each(s)

BOLT

Batch: M109431

JS

19.0

AN960C10L

washer



Comment: Qty.: ~~44~~ 44.0000 Each(s)/Unit Total: ~~44~~ 44.0000 Each(s)

WASHER

Batch: M109545

JS

20.0

D356613

Gasket



Comment: Qty.: 1.0000 Each(s)/Unit Total: 1.0000 Each(s)

GASKET

Batch: B411862

JS

08.11.06

D

W/O:		WORK ORDER CHANGES						
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Drawing Name: SKIDTUBE

Job Number: 41315A

Part Number: D204635041

Job Number:



Seq. #:

Machine Or Operation:

Description :

21.0

D35667

Gasket



Comment: Qty.: 1.0000 Each(s)/Unit Total : 1.0000 Each(s)

GASKET

Batch: B37354

W

22.0

D35661

Gasket



Comment: Qty.: 2.0000 Each(s)/Unit Total : 2.0000 Each(s)

GASKET

Batch: B412237

W

23.0

D356413

Wearshoe



Comment: Qty.: 1.0000 Each(s)/Unit Total : 1.0000 Each(s)

WEARSHOE

Batch: B41933

W

24.0

D356411

Wearshoe



Comment: Qty.: 1.0000 Each(s)/Unit Total : 1.0000 Each(s)

WEARSHOE

Batch: B412248

W

25.0

D35649

Wearshoe



Comment: Qty.: 1.0000 Each(s)/Unit Total : 1.0000 Each(s)

WEARSHOE

Batch: B41465

W

26.0

D35647

Wearshoe



Comment: Qty.: 1.0000 Each(s)/Unit Total : 1.0000 Each(s)

WEARSHOE

Batch: B33803

W

27.0

D25943

O-Ring, 205 Skidtube



Comment: Qty.: 10.0000 Each(s)/Unit Total : 10.0000 Each(s)

O-Ring

Batch: B329908

W

08-11-06 (K)

W/O:		WORK ORDER CHANGES						
DATE	STEP	PROCEDURE CHANGE		By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

QA: N/C Closed: _____ Date: _____

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Drawing Name: SKIDTUBE

Job Number: 41315A

Part Number: D204635041

Job Number:



Seq. #:

Machine Or Operation:

Description :

28.0

D25941

Plug, 205 Skidtube



Comment: Qty.: 10.0000 Each(s)/Unit Total: 10.0000 Each(s)

Plug

Batch: B40153

JD

29.0

HAND FINISHING1

HAND FINISHING RESOURCE #1



Comment: HAND FINISHING RESOURCE #1

1-Install inserts & wearplates & gaskets using a drop of Sikaflex on insert holes before installing wearplates

A/R Sikaflex-291 M104449

Sikaflex expire date: 08/11

2-Coat D2594-3 O' rings with Petroleum Jelly and install on D2594-1 plugs as per Dwg D2580

3-Inspect for foreign object per QSI 024

4-Install 2855 Aft Cap as per Dwg D2590 and seal Fwd Step & Aft Cap with Sikaflex. Clean excess adhesive

A/R Sikaflex-291 M104449

Sikaflex expire date: 08-11

5-Wing Walk as per Dwg D2590 and QSI 005 4.4

M109219

Batch:

JD
08.11.06

30.0

QC5

INSPECT WORK TO CURRENT STEP



Comment: Inspect Aft Cap, Fwd Step and Wing Walk of work to Current Step Inspect for Foreign objects per QSI 024

31.0

QC21

FINAL INSPECTION/W/O RELEASE



Comment: FINAL INSPECTION/W/O RELEASE

08/11/06

Job Completion



PPP41315

Julz

54

MF 08-11-07

W/O:		WORK ORDER CHANGES						
DATE	STEP	PROCEDURE CHANGE		By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)							
DATE	STEP	Description of NC Section A	Corrective Action		Section B		Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng		Sign & Date			

NOTE: Date & initial all entries

DART

DESIGN <i>[Signature]</i>	DRAWN BY <i>[Signature]</i>	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
CHECKED <i>[Signature]</i>	APPROVED <i>[Signature]</i>	DRAWING NO. D2590	REV. D SHEET 1 OF 2
DATE 07.04.05		TITLE 204 SKIDTUBE ASSEMBLY	SCALE NTS
A	96.09.16	NEW ISSUE	
B	96.12.02	AS MANUFACTURED	
C	98.08.28	REDRAWN, INCLUDED DEO 9094/9097	
D	07.04.05	CHANGE TO SS WEARPLATES AND GASKETS, INCLUDE DEO 9124	

RELEASED
07-06-28-*[Signature]*

QTY -041	Part Number	Description
X	D2590-041	SKIDTUBE ASSEMBLY
1	D2500-1-190	EXTRUSION
1	D2576-3	STEP
17	D2579	CROSS BOLT SPACER
10	D2594-1	PLUG
10	D2594-3	O-RING
1	D2597	204 WEB
1	D2855	AFT CAP
1	D3564-7	WEARSHOE
1	D3564-9	WEARSHOE
1	D3564-11	WEARSHOE
1	D3564-13	WEARSHOE
2	D3566-1	GASKET
1	D3566-7	GASKET
1	D3566-13	GASKET
44	ALS7-1032-130 or AKS7-1032-130 or AKS4-1032-130 or AELS-1032-130	INSERT
44	AN3C4A	BOLT
2	AN3-5A	BOLT
44	AN960C10L	WASHER
2	AN960JD10L	WASHER

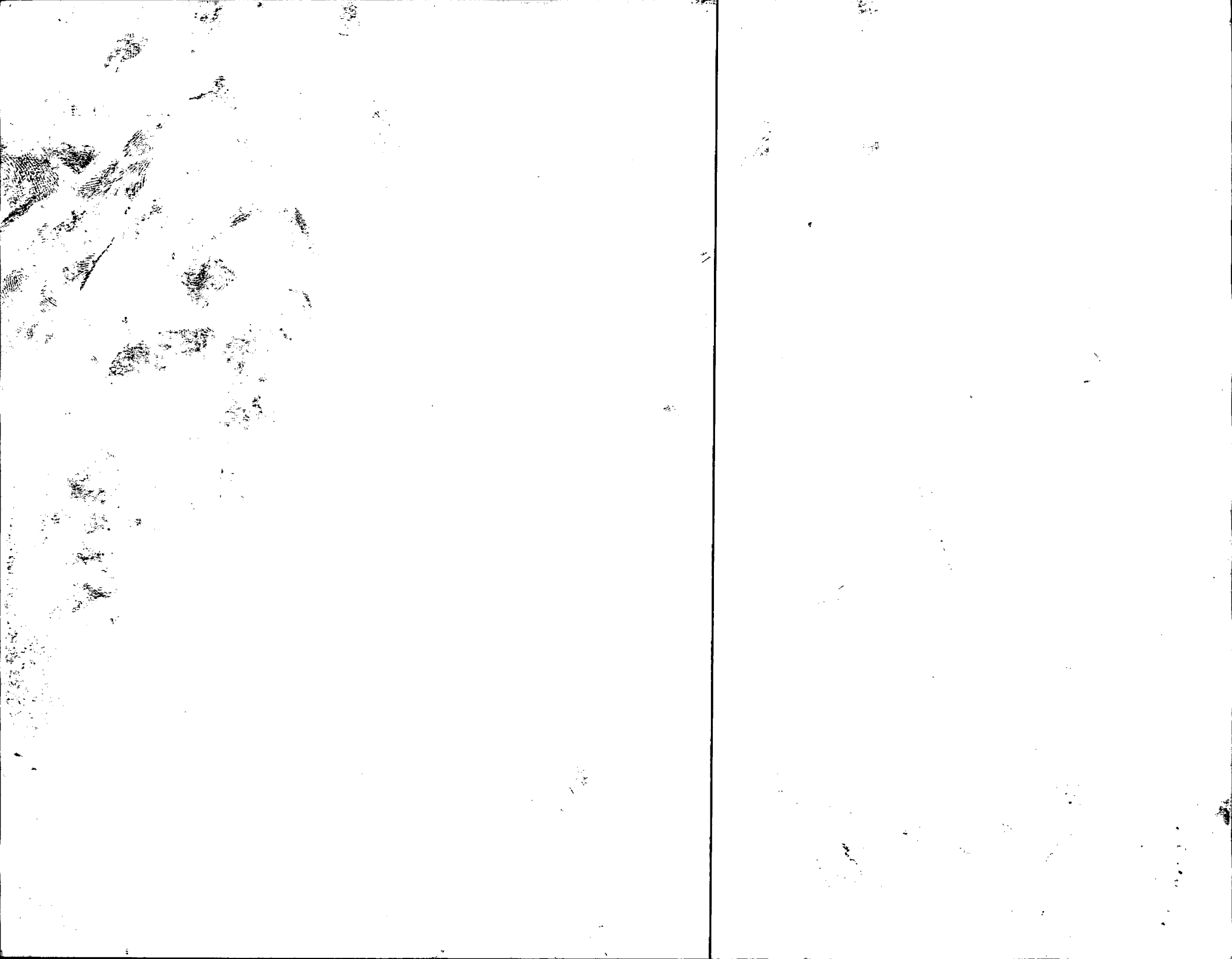
GENERAL NOTES:

- 1) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED
- 2) ALL DIMENSIONS ARE IN INCHES
- 3) INSERT D2597 WEB TO LOCATION SHOWN OFF AFT END OF SKIDTUBE AND BOND WEB INTO OUTER TUBE WITH NON-STRUCTURAL SIKAFLEX-241 ADHESIVE PER DART QSI 015 BEFORE BENDING. ENSURE HOLES LINE-UP.
- 4) BEND AS A SMOOTH RADIUS STARTING WITH A MAXIMUM CENTERLINE RADIUS OF 60 AND ENDING WITH A MINIMUM RADIUS OF 30. A MAXIMUM REDUCTION OF 0.200 IN DIAMETER IS ALLOWABLE IN THE BENT PORTION OF THE TUBE.
- 5) USE DART DRILL TEMPLATE TD2577-204 TO LOCATE AND DRILL $\varnothing 0.297$ HOLES FOR WEARSHOE INSERTS. INSTALL ALS7-1032-130 PER SECTION D-D (44 PLACES) AFTER FINISH. INSTALL AN3C4A BOLTS AND AN960C10L WASHERS WITH SIKAFLEX-241/-291.
- 6) WELDING TO BE DONE PER DART QSI 004.
- 7) FINISH:
ACID ETCH, ALODINE PER DART QSI 005 4.1 PRIOR TO INSERTING D2596 WEB
POWDER COAT ASSEMBLY GLOSS WHITE (REF 4.3.5.1) PER DART QSI 005 4.3
BLACK ANTI-SKID PAINT AS INDICATED PER DART QSI 005 4.4
- 8) INSERT D2594-1 PLUG C/W D2594-3 O-RING IN HOLES MARKED 'P' (BOTH SIDES OF TUBE) AFTER FINISH (16 PLACES).

SHOP COPY
RETURN TO
ENGINEERING
UNCONTROLLED COPY
SUBJECT TO AMENDMENT
WITHOUT NOTICE
WORK ORDER
NO. 41315A

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RELEASED
07-06-28

Diagram illustrating the grinding locations on a propeller cross-section:

- GRIND FLUSH (4 PLACES)
- GRIND FLUSH
- D2576-3 STEP
- GRIND FLUSH
- LOCATION RIDGE ON UNDERSIDE OF D2576
- GRIND FLUSH

DRILL PRIOR TO D2855 CAP
INSTALLATION (2 PLACES)

#0.208

AN3-5A BOLT (1)
AN960JD10L WASHER (1)
(2 PLACES)

D2855 CAP

SEAL WITH SIKAFLEX-241

0.40

AFTER DRILLING AND BENDING ASSEMBLY
PERFORM THE FOLLOWING FOR #0.508 HOLES ONLY:

1. CHAMFER HOLE 0.050 X 45°
2. INSERT D2579 SPACER (17 PLACES)
3. WELD INTO PLACE AND GRIND FLUSH
4. C-BORE D2579 SPACER TO 0.437 X 1.00 DEEP

[illegible]

D2930-041 ASSEMBLY DETAIL

WELD AS PER DETAIL B

BLACK ANTI-SKID TOP OF STEP TO 0.5 ABOVE BOTTOM EDGE

BLACK ANTI-SKID TO 0.5 ABOVE LOCATION RIDGE

0.5

1.5

1.5

1.5

1.5

1.5

8

D

P

P

P

P

P

P

D

D

REFER TO DETAIL C

D3566-1

D3566-7

D3566-1

D3566-13

D3564-11

D3564-7

D3564-9





D3564-13

AN3C4A BOLT (1)

AN960C10L WASHER (1)

(44 PLACES)

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DESIGN		DRAWN BY	
CHECKED		APPROVED	
DATE			
07.04.05			

DART AEROSPACE LTD.
HAMKESBURY, ONTARIO, CANADA

DRAWING NO.	D2590
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TITLE
204 SKIDTUBE ASSEMBLY

REV. D
SHEET 2 OF 2
SCALE

REV. D

2 OF 2

SCALE

1:24

NO. 171

AWS D17.1.2001
QUALIFICATION TEST RECORD

Name: Barclay Elliot
Job number: 41300
Part number: D205 634 C41
Description: 205 shield tube
Welding Process: Tig[☒] Mig[]
Base material: Aluminium
Current: AC[] DC[☒]

TEST REQUIREMENTS AND RESULTS

Visual: pass[☒] fail[]
Penetration: pass[☒] fail[]

UNACCEPTABLE

Cracks: pass[☒] fail[]
Undercut: pass[☒] fail[]
Pin holes: pass[☒] fail[]
Overlap (cold lap): pass[☒] fail[]
Porosity (surface): pass[☒] fail[]
Coloration: pass[☒] fail[]

Qualifier Pet Dm Date of Test Coupon 08-09-03
Welder Barclay Elliot Date of Test Coupon 08-09-03

The above named individual is qualified in accordance with AWS D17.1.2001 to weld

